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EXAMINER	
WONG, EDNA	

ART UNIT	PAPER NUMBER
1753	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	**Application No.** 10/677,409	**Applicant(s)** COHEN, ADAM L.
	Examiner Edna Wong	**Art Unit** 1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2007*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.
    4a) Of the above claim(s) *13-36* is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-12* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All b)☐ Some * c)☐ None of:
        1.☐ Certified copies of the priority documents have been received.
        2.☐ Certified copies of the priority documents have been received in Application No. _____.
        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Election/Restrictions

Applicant's election without traverse of Group **I**, claims **1-12**, in the reply filed on January 16, 2007 is acknowledged.

Accordingly, claims **13-36** are withdrawn from consideration as being directed to a non-elected invention.

The requirement is still deemed proper and is therefore made FINAL.

Specification

The disclosure is objected to because of the following informalities:

page 1, line 3, the words -- , now US Patent No. 6,790,377, -- should be inserted after the year "2000".

page 12, line 16, reference character "132" has been used to designate both the spun-on filler composition and a liquid filler composition (from page 12, line 13). It is unclear what reference character "132" designates.

page 12, line 16, the word -- the -- should be inserted after the word "allowing".

page 16, line 25, reference character "156" has been used to designate both an unpatterned mask and a patterned mask. It is unclear what reference character "156" designates.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

I. Claims **1-12** are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for *electrodepositing* the layers, does not reasonably provide enablement for *non-electrodepositing* the layers. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

Claim 1

line 10, recites “depositing”.

line 14, recites “building”.

“Depositing” and “building” read on non-electrodepositing the layers. Applicant's specification discloses that the invention relates to forming structures by *electrochemical deposition* (page 1, [4]; and page 6, [57]). Thus, the specification is not enabling for a non-electrodepositing method.

II. Claims **1-12** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

lines 6-7 and 10, respectively, recite "a first layer", "a first mask" and "a first pattern". However, there is no second layer, second mask and second pattern recited in the claims for there to be a "first".

Furthermore, the "building" step does not require using a mask having a pattern.

lines 11-12, it appears that "a first layer" is the same as the first layer recited in claim 1, line 6. However, it is unclear if it is. If it is not, then what is the relationship between the first layers?

Claim 2

line 4, "the other of a structural material" lacks antecedent basis.

Claim 3

lines 1-2, "the patterning for each mask" lacks antecedent basis.

Claim 4

line 1, recites "wherein the first material *comprises* a first metal". It is unclear how this limitation further limits claim 2, when claim 2, lines 1-2, already recites that the first material *comprises* a sacrificial material or a structural material.

There are two separate, independent definitions for the first material. What is their relationship?

Claim 5

line 1, recites "wherein the second material *comprises* a second metal". It is unclear how this limitation further limits claim 2, when claim 2, lines 3-5, already recites that the second material *comprises* the other of a structural material or a sacrificial material.

There are two separate, independent definitions for the second material. What is their relationship?

Claim 8

lines 1-2, recites "wherein the forming of the first layer *comprises* removing a portion of at least one of the deposited materials". It is unclear how this limitation further limits claim 1, when claim 1, lines 6-13, already recites that the forming of a first layer *comprises* steps (a) to (c).

There are two separate, independent definitions for the forming step. What is their relationship?

Claim 10

line 2, "the second material" lacks antecedent basis.

Claim 11

line 2, "the second material" lacks antecedent basis.

III. Claims **1-12** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are:

(a) the step for fabricating the multi-layer three-dimensional structure.

Claim 1

line 1, recites "A method for fabricating a multi-layer three-dimensional structure". However, the body of the claim does not recite anything about fabricating the multi-layer three-dimensional structure.

(b) the completion of the first layer for building the additional layers.

Claim 1

lines 11-12, recite "to form a portion of a first layer".

The method never recites completing the portion of the first layer. Thus, how are the additional layers built adjacent to and adhered to previously formed layers?

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims **1-12** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims **7-33 and 39-53** of U.S. Patent No. 6,475,369. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant application and patent are claiming common subject matter:

> 19. The method of claim 7, further comprising: ***determining a current cross section*** to be processed for a given level of the multilayer structure; comparing said current cross section to previously-generated mask cross sections; and if the current cross section is similar enough, within a predetermined tolerance, then assigning said previously-generated mask to the given level.
>
> 32. A method for fabricating a multi-layer 3-dimensional (3-D) structure according to a 3-D description, comprising: ***processing said 3-D description to obtain a plurality of 2-dimensional (2-D) descriptions of cross sections of said 3-D structure***; fabricating one or

more selective electrodesposition masks each corresponding to at least one of said 2-D descriptions; using said selective electrodeposition masks; and electrodepositing one or more materials to form structures corresponding to said 2-D descriptions in succession over a substrate.

39. A method of fabricating a three-dimensional element from at least one structural material, wherein the at least one structural material comprises one of a first electrodeposition material or a second electrodeposition material, wherein a sacrificial material comprises the other of the first electrodeposition material or the second electrodeposition material, and wherein the three dimensional element is formed from a plurality of electrodeposited layers, the method comprising: (a) providing a substrate which may include one or more previously deposited layers of a solidified material; (b) providing an electrodeposition source of the first electrodeposition material; (c) providing an electrodeposition source of the second electrodeposition material; ***(d) providing a plurality of preformed masks with negative features and with non-conductive positive features, wherein either the positive or negative features on each mask represents at least a portion of at least one cross-section of the three-dimensional element to be formed***; (e) contacting a selected one of said preformed masks to a surface of said substrate thereby forming a non-conductive barrier over a portion of the surface of the substrate; (f) while the mask and the surface of the substrate are in contact with the first electrodeposition source, providing electric power to the electrodeposition source in a manner to cause deposition of the first electrodeposition material onto the surface of the substrate, in a pattern corresponding to the negative features of the selected mask, to form a portion of an electrodeposited layer; (g) separating the selected mask from said substrate; (h) performing at least one additional electrodeposition operation to complete formation of a electrodeposited layer wherein the at least one additional electrodeposition operation comprises deposition of the second electrodeposition material; (i) repeating (e) through (h) a plurality of times to form additional layers adjacent to and adhered to previously formed layers of the three-dimensional element wherein at least one selected mask is used in the formation of each layer, and wherein at least a portion of the selected masks are different for at least a portion of the layers; (j) separating the structural material from at least a portion of the sacrificial material to yield the three-dimensional element.

The claims of the instant application fail to be patentably distinct from the claims of the patent because the independent claims of the instant application recites similar limitations, either alone or in combination with their dependent claims, as that of the claims of the patent wherein the claims of the instant application encompasses the claims of the patent. Therefore, the claims of the instant application would have been obvious an variant of the claims of the patent, and vice versa.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **1-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Guckel** (US Patent No. 5,190,637) in combination with **Osterberg et al.** ("MEMBUILDER": An Automated 3D Solid Model Construction Program for Microelectromechanical Structures", The 8th International Conference on Solid-State Sensors and Actuators, and Eurosensors IX. Stockholm, Sweden, June 25-29, 1995, pp. 21-24).

Guckel teaches a method for fabricating a multi-layer three-dimensional structure (= results in a three dimensional structure) [col. 5, lines 59-65], comprising:

(i) forming a first layer, comprising:

a) providing a first mask **33** (= a photoresist) [col. 4, lines 65-67] in contact with a substrate **30**, wherein the mask has a first pattern of openings therein (= X-ray exposure and dissolving of the photoresist in a desired pattern) [col. 4, line 67 to col. 5, line 1];

b) depositing a first pattern of a first material **34** (= a primary layer of a first metal) from a source of the first material onto said substrate using the first mask to form a portion of a first layer (col. 4, line 67 to col. 5, line 3; and Fig. 2) ;

c) removing the first mask from the substrate (= the photoresist **33** is removed) [col. 5, line 6-7; and Fig. 3];

(ii) building additional layers adjacent to and adhered to previously formed layers (= the process may continue with further layers) [col. 5, lines 27-28].

The first material comprises a sacrificial material or a structural material (= nickel); and wherein the formation of the first layer, additionally comprises depositing a second material **36** (= a secondary metal) onto the substrate, wherein the second material comprises the other of a structural material or a sacrificial material (= silver) [col. 5, lines 6-11 and lines 59-65].

The method further comprises, aligning the patterning for each mask with a structure on said substrate (= a second layer X-ray mask is aligned to the structure and an exposure is made with X-rays, such as a synchrotron, and the photoresist is then developed to remove portions of the photoresist to expose at least some if not all of the surface of the first layer of primary metal **34** as well as part of the surface of the first layer of secondary metal **36**) [col. 5, lines 31-37; and Fig. 6].

The first material comprises a first metal (= nickel) [col. 5, lines 10-11].

The second material is a second metal (= silver) [col. 5, lines 10-11].

The first metal is the structural material and the second metal is the sacrificial material (= the secondary metal can then be removed) [col. 5, lines 59-65].

The forming of the first layer comprises removing a portion of at least one of the deposited materials (= the exposed surface is micromilled down until the primary metal **34** is exposed and substantially uniform flat surface **37** is formed) [col. 5, lines 12-16; and Fig. 4].

The removing is performed during a process of planarizing a surface of the first layer (Figs. 3-4).

The first material comprises a structural material (= nickel) and the second material comprises a sacrificial material (= silver) [col. 5, lines 10-11], and wherein the method additionally comprises: (iii) releasing the structural material from the sacrificial material after formation of the multi-layer structure (= which results in a three-dimensional structure which has features, such as overhangs and projections, which are not obtainable with a single layer process) [col. 5, lines 59-65].

The method of Guckel differs from the instant invention because Guckel does not disclose the following:

a. Processing a three-dimensional (3-D) description of the structure to obtain a plurality of 2-dimensional (2-D) descriptions of cross sections of said 3-D structure, as recited in claim 1.

b. Wherein the mask is formed using one of the plurality of 2-D descriptions, as recited in claim 1.

c. Using at least one other 2-D description, as recited in claim 1.

Like Guckel, Osterberg teaches forming micromechanical structures. Osterberg teaches that MEMBuilder automates the process of 3D solid model construction of MEMS structures starting from user defined process data and 2D mask data (page 21, "Summary"). The user completes a 2D mask layout design in CIF format. MEMBuilder mimics the simplified process by a sequence of operations to create *layers* in the solid model. Each *layer* is built by a *deposit* followed by a corresponding *etch* (pages 22-23, "MEMBuilder Operation"). MEMBuilder frees the user from the burden of having to learn and execute the complex details of the I-DEAS solid modeling software and thereby greatly improves the MEMS designer's productivity (page 22, bridging paragraph).

MEMBuilder supports four deposit types (page 21, Figure 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Guckel by processing a three-dimensional (3-D) description of the structure to obtain a plurality of 2-dimensional (2-D) descriptions of cross sections of said 3-D structure; and using at least one other 2-D description because depositing the materials in this way would have automated the process of 3D solid model construction of MEMS structures and would have freed the user from the burden of having to learn and execute the complex details of the I-DEAS solid modeling software and thereby greatly improves the MEMS designer's productivity as taught by Osterberg (page 21, "Summary"; pages 22-23, "MEMBuilder Operation"; and page 22, bridging paragraph).

Providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art (MPEP § 2144.04(III)).

d. Wherein each cross-section description is spaced from adjacent cross-section descriptions by a desired layer thickness, as recited in claim 12.

Osterberg teaches that the program iteratively "deposits" Layers 1 through N (each layer is of type conformal, planar, stacked or via) over a previous underlying surface topology *to the thickness specified in the process text file* (page 22, "MEMBuilder Operation").

e. Wherein the first metal is the sacrificial material and the second metal is the structural material, as recited in claim 6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the first metal and the second metal described by Guckel with wherein the first metal is the sacrificial material and the second metal is the structural material because the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

f. Wherein the first material comprises a sacrificial material and the second material comprises a structural material, as recited in claim 10.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the first material and the second material described by Guckel with wherein the first material comprises a sacrificial material and the second material comprises a structural material because the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edna Wong
Primary Examiner
Art Unit 1753

EW
February 1, 2007